tions by their investigations made during a two months' residence in the lighthouse at the Isle of May—a famous bird observatory situated in the North Sea off the mouth of the Firth of Forth. There are also contributions from nearly one hundred observers, posted between the Muckle Flugga (the northernmost limit of the British Isles) and the shores of the Solway and Tweed. This vast amount of material has been arranged under the following headings: birds new to Scotland; uncommon visitors and species new to faunal areas; extension of breeding range; hybrids; summer and nesting; winter; ringing; plumage; food, habits, &c.; and migration.

Much that is interesting is recorded under all these headings, but the special feature of the report lies in the wealth of data from the numerous islands—the most important, in some respects, of all bird stations.

These insular records relate mainly to the spring and autumn passage-movements of those feathered voyagers which traverse our shores when *en route* between their accustomed northern summer haunts beyond our isles, and their winter retreats lying to the south of them. These birds form by far the most numerous class of migrants that visit the British area. At such stations, especially the northern stations, the comings and goings of these travellers are to be observed free from the complications that arise on the mainland through the presence of birds of the same species which are simply local natives or engaged in local movements. In addition, the recent attention devoted to island stations has resulted in the garnering of a remarkable crop of records on the occurrence of rare visitors, some of them mere waifs, while others formerly considered such have unexpectedly proved to be annual in their appearances—among others the yellow-browed warbler, red-spotted bluethroat, little bunting, ortolan bunting, and grey-headed wagtail.

The year 1912 was remarkable for the number of rare species detected at Scottish stations. These included the black chat, northern bullfinch, scarlet grosbeaks, little buntings, Richard's pipit, red-breasted flycatchers, Blyth's reed warblers, icterine warblers, barred warblers, snowy owl, Tengmalm's owl, broad-billed sandpiper, Temminck's stints, little bustard, &c., the visits of which are duly recorded along with the particulars relating to their occurrence.

In conclusion Scottish ornithologists have every reason to be satisfied with the results of the year's investigations and may congratulate themselves on the able and excellent manner in which these results are set forth in the report.

W. E. C.

NOTES.

A FEW days ago (October 2) the daily Press published sensational paragraphs to the effect that Sir Frederick Treves had announced, at the Radium Institute, "a complete revolution in the future of radium." When analysed, the "revolution" amounts to little more than a statement that the Radium Institute has begun to collect radium emanation in sealed glass tubes, and to issue the tubes to doctors for the treatment of their patients. It was assumed by the literary young men who write the leaders and notes in the daily papers that radium emanation had just been discovered instead of being known and named for ten years or more, so they let their enthusiasm overstep the bounds of their knowledge. Even the method referred to by Sir F. Treves is not new; it was published in *The Lancet* on December 11, 1909, p. 1742 ("On the Use of Radium for Local Application within the Body," by Dr. Alfred C. Jordan), and this paper is quoted and fully abstracted by Dr. Dawson Turner in his book on "Radium: its Physics and Therapeutics" (Baillière, Tindall and Cox, 1911), pp. 27 and 28. In *The Lancet* the glass tube containing the emanation was directed to be enclosed in a tube of lead "compo" of 1 mm. thickness, and this in its turn in a length of rubber tubing. Of course, these tubes must be used at once, for the emanation decays to one-half its initial strength in three and a half days. A tube of initial strength equal to 10 mg. of radium may be placed in contact with a tumour, and left to "decay" there. It will be understood that emanation used in this way (in sealed tubes surrounded by 1 mm. of lead) depends for its action on its γ rays and its hardest β rays, the glass stopping all the α radiation, while the lead absorbs most of the β rays. Very different is the action of free radium emanation, as in radio-active waters. In the latter case the α particles are able to bombard the tissues at close quarters; the action of the β and γ radiation then becomes negligible, possessing no more than one-hundredth part of the energy of the α radiation. Great care must be used in applying α radiation to the tissues, for the destructive action is most pronounced. Good results have been obtained with radium in many diseases, but the hopes of the public as well as the medical profession are centred round the treatment of cancer. Even in this dreaded disease many favourable results have been reported both with radium and with the Röntgen rays, but unfortunately disappointments are far more frequent than cures.

THE year 1914 is the centenary of the birth of Sir John Lawes, and 1917 is that of Sir Henry Gilbert; and it is proposed by the Society for Extending the Rothamsted Experiments to raise the sum of 6000*l.* by public subscription for the purpose of erecting a suitable commemoration laboratory at the Rothamsted Experimental Station. It is understood that if 6000*l.* is raised in this way, a further grant of 6000*l.* can be obtained, making a total of 12,000*l.* altogether, for which sum an adequate building could be put up. The rapid development of agricultural chemistry and bacteriology, and particularly of the special branches associated with Rothamsted—the composition of crops and the study of the soil in relation to the plant—has necessitated further increases in the laboratory staff, and has attracted a number of voluntary workers. For all these more modern accommodation is required than can be obtained in the older part of the present buildings. The work of Lawes and Gilbert not only laid the foundations of agricultural chemistry as a science in this country, but did much to improve British agriculture and raise it to its present high level. It also played a great part in developing the artificial fertiliser industry, which has remained an essentially British industry and has now assumed vast dimensions. The whole country has gained enormously through the work of these two men. It is therefore felt that the appeal should be national, and several committees have been formed for the purpose. Men of science have many calls on them, but it is hoped, nevertheless, that the sympathy which everyone feels with the Rothamsted work will manifest itself by practical assistance towards its development. Subscriptions should be sent to the Secretary, Rothamsted Experimental Station, Harpenden, Herts.

IT is with great regret that we record the disappearance of Dr. Rudolph Diesel from the G.E.R. steamer *Dresden* on her voyage from Antwerp to Harwich on the night of September 29; the circumstances are such as to leave no hope of his being alive. Dr. Diesel will be remembered as the inventor of the oil engine which bears his name. Born in Paris in 1858, of German parentage, his training included courses at the Augsburg technical schools and at the Munich Technical College. His first published description of the Diesel engine appeared in 1893; aided financially by Messrs. Krupp and others, the next few years were spent in arduous efforts to realise the principle of his engine in a commercially successful machine. The difficulties to be overcome were very great. In the earliest attempt, compression of the air was effected in the motor cylinder and the fuel injected direct. This engine exploded with its first charge and nearly killed the inventor. The modern Diesel engine compresses the air in the motor cylinder to a pressure above 400 lb. per square inch, during which process the air becomes hot enough to ignite the fuel. At the end of compression, the fuel is injected by means of a separate air supply at a pressure higher than that in the cylinder. Nothing of the nature of an explosion occurs in the cylinder; the oil burns as it is injected, and, as the piston is moving outwards at the same time, the pressure does not rise to any extent. The fuel consumption of these engines is remarkable, being roughly one-half of any other type of oil motor. Engines both of a two-stroke cycle and of a four-stroke cycle are now being developed by many firms both on the Continent and in Britain. In Dr. Diesel's opinion the two-stroke engine would probably be the standard type for marine purposes. Marine Diesel engines of very large power have not yet been constructed, but many important experiments in this direction are being made. Dr. Diesel's loss will be regretted by men of science on account of his efforts to interpret practically the Carnot ideal cycle, and by engineers on account of the immense strides which his untiring energy and indomitable pluck have made possible.

SIR WILLIAM CHRISTIE, K.C.B., F.R.S., formerly Astronomer-Royal, has been elected Master of the Clockmakers' Company.

THE death is announced, at fifty-four years of age, of Dr. W. Carnegie Brown, joint secretary of the Society of Tropical Medicine and Hygiene, and author of papers on malaria and diseases of the tropics.

IT is announced in *The Athenaeum* that in consequence of the efforts of Dr. C. Holder and others, extending over many years, the Legislature of California has constituted the island of Santa Catalina a fish refuge. In future there will be no netting within three miles of the shore of the island.

THE first ordinary meeting of the Medical Society of London for the session 1913–14 will be held on Monday next, October 13, when the new president, Sir David Ferrier, F.R.S., will deliver his inaugural address. The Lettsomian lectures of the society will be given on February 2 and 16 and March 2 by Dr. F. M. Sandwith, who will treat of the subject of dysentery.

ACCORDING to *The Electrical Review*, a wireless receiving installation has been set up in the cathedral at Florence by the director of the Florence Observatory. All the parts of the equipment are within an enclosed space, the antennæ being within the building. Messages have been received from Paris, Toulon, and Madrid, the efficiency of the receivers being, it is stated, only slightly less than if in the open air.

A PUBLIC meeting in connection with the ninth quinquennial festival of the Royal Albert Institution, Lancaster, will be held at Lancaster on Tuesday, October 21, when the following addresses will be given:—"The Feeble-minded: Historical Retrospect," Sir T. Clifford Allbutt, K.C.B., F.R.S.; "The Future of the Royal Albert Institution," Sir J. Crichton Browne, F.R.S.; "The After-care of the Feeble-minded," Dr. C. H. Bond.

THE fourth exhibition of models, tools, and scientific apparatus, organised by the proprietors of *The Model Engineer*, will be held at the Royal Horticultural Hall, Westminster, S.W., on October 10–18. Special rooms are to be devoted to wireless telegraphy in operation, and to aëroplane models of all kinds, while a completely equipped workshop will be manned by members of the London Society of Model and Experimental Engineers, who will give demonstrations of model-making and workshop operations.

A CONFERENCE of members of the Museums Association and others interested in similar work is to be held at the Warrington Museum on Thursday afternoon, October 30, for the purpose of discussing subjects of common interest to those concerned in the work of museums, art galleries, and kindred institutions. Offers of papers or suggestions of suitable subjects for discussion should be sent to Mr. C. Madeley, director of the Warrington Municipal Museum.

A DEMONSTRATION of the results of his researches into the pathology of rabies will be given on Monday next to the Royal Society of Medicine by Dr. Hideyo Noguchi, of the Rockefeller Institute. Dr. Noguchi proposes to show pure cultures of various pathogenic and saprophytic spirochætæ; to demonstrate the presence of treponema pallidum in the brain in cases of general paralysis; to show experimental general paralysis in rabbits; and to give a demonstration of cultural studies of the virus of rabies.

In response to numerous requests, it has been decided to defer until October 31 the closing of the Historical Medical Museum, referred to in our issue of July 3 (vol. xci., p. 456). During the month of October the exhibition will remain open from 10 a.m. to 6 p.m. daily, and from 10 a.m. to 1 p.m. on Saturdays. After this date it will be closed for a few months for re-arrangement as a permanent museum. It is proposed to reopen the museum in its permanent form in the spring of next year.

A moderately strong earthquake was felt in the neighbourhood of the Panama Canal during the night of October 1–2, and has evidently caused some concern with regard to the safety of the canal from future shocks. It would seem, however, that there is little need for anxiety. Though other adjoining districts are frequently visited by destructive earthquakes, the isthmian zone itself is singularly free from such disturbances. Moreover, as Milne and Omori have shown, earthquake vibrations are much less intense in excavations than on the surface of the surrounding land.

It is announced in *Science* that the Walker prizes in natural history of the Boston Society of Natural History for the present year have been awarded as follows:—The first prize of 100 dollars to Dr. R. A. Spaeth for a paper on an experimental study concerning the chromatophores of fishes, and the second of 50 dollars to Prof. O. D. von Engeln for a paper on the effects of continental glaciation on agriculture. Prizes for 1914 and 1915 will be awarded for original and unpublished research work in any biological or geological subject. Competing essays must reach the secretary of the society on or before April 1 next.

Major Barrett-Hamilton, accompanied by Mr. Stammwitz, one of the taxidermists on the staff of the British Museum (Nat. Hist.), sailed in a whaler on Saturday last for South Georgia, on a mission from the Colonial Office, to report on the whaling stations leased by the British Government to a Norwegian firm. The species hunted at the South Georgian stations are chiefly rorquals, of which the slaughter is reported to be very heavy; and we understand that the main object of the mission is to ascertain whether the whales stand in danger of extermination. The taxidermist will endeavour to obtain specimens (not, of course, entire whales) for the museum.

Mr. Alvin Langdon Coburn's exhibition of camera pictures, which is to be seen at the Goupil Gallery, 5 Regent Street, until October 25, is well worth a visit from anyone interested in artistic photography. The series of pictures of the Grand Canyon exhibit this remarkable region in a new light. Mr. Coburn's photographs, all enlargements from quarter-plate negatives, are as far apart from Hayden's well-known topographical drawings as could well be imagined; the latter faithfully delineate the grandeur of the vast spaces and lofty walls of the great valley by delicacy and accuracy of line and by their panoramic outlook. Mr. Coburn, limited by his apparatus to a smaller field, conveys the same sensations of vastness by his artistic use of atmosphere and the great shadows cast by hill and cloud. Clouds indeed are made the most of in all these pictures, and No. 44, "The Cloudburst," is not only a striking photograph, but a valuable record of this phenomenon.

At the recent International Congress of Pharmacy held at the Hague, a proposal to form an international pharmacopœial bureau was discussed, and a commission was appointed to consider the question, and to submit to the International Pharmaceutical Federation at an early date a scheme for the establishment of such a bureau. The commission is composed of seven members, representing respectively Great Britain, the United States, Germany, France, Holland, Belgium, and Switzerland; most of the members are associated with the revision of their national pharmacopœias, the English representative being Prof. H. G. Greenish, joint editor of the "British Pharmacopœia," and the American, Prof. J. P. Remington, editor of the "United States Pharmacopœia." As the outcome of the deliberations of such a strong committee, a useful plan may be expected Among the duties of such a bureau as that proposed would be the collection and examination of all literature relating to pharmacopœial revision and the experimental investigation of new drugs and preparations, and no doubt the influence of the bureau would tend to encourage the work already commenced in the direction of the unification of pharmacopœias.

The South African Journal of Science for September, being the organ of the South African Association for the Advancement of Science, reports the business proceedings of the meeting of the association held at Lourenco Marques in July last, under the presidency of Dr. A. W. Roberts. The following officers were elected for 1913–14:—President, Prof. R. Marloth; vice-presidents, Prof. L. Crawford, Mr. S. Evans, Dr. W. Johnson, and Mr. A. F. Williams; general secretaries, Dr. C. F. Juritz and Mr. H. E. Wood; general treasurer, Mr. A. Walsh. Invitations to hold the next annual meeting were received from the mayors and councils of both Kimberley and Pretoria; and the final decision as to the place was left to the council. A resolution was passed "that the Government of the Union be asked to pass legislation declaring that meteorites are Government property, and when found should be delivered to the nearest magistrate, for transmission to the nearest museum under Government control." The sixth award of the South Africa Medal, together with a grant of 50*l*., was made to Dr. A. W. Rogers, assistant director of the Geological Survey of the Union, in recognition of his geological work in the Cape Province. In connection with the grant of 100*l*. made to Dr. A. W. Roberts by the association in 1905 for the reduction of his variable star observations, Dr. Roberts reported that he has had the observations, some 60,000 in number, reduced, copied in dulplicate, and indexed. The question of printing has, however, been a difficulty.

THE Board of Agriculture and Fisheries has issued a "Horses (Importation and Transit) Order of 1913" in accordance with powers conferred by the Diseases of Animals Acts, 1894 to 1911. The Order came into force on October 1; it provides for the proper accommodation of horses, asses, and mules on all vessels on which such animals are carried to or from any port in Great Britain, and for the proper construction of railway trucks used for conveying such animals in Great Britain. Provision is made for the proper feeding and watering at places of unloading and during transit. It is made illegal to convey any horse, ass, or mule by boat or train if, in the opinion of an inspector of the Board and notified by him, the animal cannot, owing to infirmity, illness, injury, fatigue, or any other cause, be so carried without unnecessary suffering. The above regulations, together with instructions as to disinfection, &c., have all been provided for by previous Orders, which have been revoked and re-enacted in the present Order. The principal reason for the present Order is to provide the following most necessary amendment, namely, that horses, asses, and mules brought to Great Britain from abroad are required henceforth to be accompanied by a veterinary certificate of freedom from symptoms of glanders (including farcy), epizootic lymphangitis, ulcerative lymphangitis, dourine, horse-pox, sarcoptic mange, psoroptic mange, influenza, ringworm, or strangles, instead of as heretofore from symptoms of glanders (including farcy) only.

WE have to acknowledge the receipt of a copy of a pamphlet issued by the Department of Lands and Survey, Victoria, on various methods of destroying rabbits and other "vermin" employed in that colony, and also containing the regulations with regard to fences of wire-netting.

THE National Equine Defence League has issued a fourth edition of a pamphlet on docking and nicking horses. The fact that Parliament has passed a law, to come into operation on January 1, 1915, making the practice of "docking" horses illegal, and that the purchase of docked remounts for the army is to be discontinued as soon as practicable, seems to render the pamphlet somewhat superfluous—at any rate, in this country.

WE have been favoured with an extract from *Neue Weltanschaung* for 1913, Heft 913 (pp. 321–332), in which Dr. W. Breitenbuch directs attention to the fact that the present year is the jubilee (fiftieth year) of Prof. Ernst Haeckel's work on evolution. The article includes a chronological account of the learned professor's studies during that long period, with brief notes on the numerous memoirs and works which have made his name famous.

To the series of biographical memoirs issued by the National Academy of Sciences, Washington, Prof. H. F. Osborn has contributed an exceedingly interesting account of the life and work of Prof. Joseph Leidy, the founder of vertebrate palæontology in America, and the last great naturalist of the type who made the entire subject of zoology their study, and published papers and works of permanent value in almost every branch. That such encyclopædic knowledge and broad grasp of the whole field of natural history can, as his biographer remarks, never reappear, is a matter for regret, as the specialised lines on which zoology is now, from necessity, studied cannot fail, in many cases at any rate, to result in narrowness of view. Although his study of the rhizopods was sufficient of itself to establish a great reputation, Leidy will chiefly be remembered as a palæontologist, and especially by his descriptions of Poëbrotherium and the so-called oreodonts, or "ruminating hogs," which paved the way for the discovery of the phylogeny of the camels and other artiodactyle ungulates.

To vol. vii., part 2, of *Annotationes Zoologicae Japonenses* Mr. B. Aoki contributes a list of Japanese and Formosan mammals. The island of Saghalien is also stated to come within the scope of the list, but no mention is made in the introduction that Korea is likewise included, although in the text we find (p. 272) a Korean shrew. On the other hand, Korea is not in the range of the tiger (p. 312), although the animal abounds in that country. The total number of forms, inclusive of subspecies, is 197. If trustworthy, the identification of three foxes with American, rather than with Asiatic or European, races is of considerable interest; but it may be noted that one of these races—the black or silver fox (*Vulpes pennsylvanicus argentatus*)—is not recognised as such in Mr. G. S. Miller's list of North American mammals (1912). In a footnote on p. 317 "Arctocyonidæ" should be "Arctoidea + Cynoidea." Mammals collected in Korea form the subject of an article by Messrs. Allen and Andrews in Bull. Amer. Mus. Nat. Hist., vol. xxxii. (pp. 427–36). In connection with the above may be noted a paper by Messrs. Jordan and Thompson on fishes from the island of Shikoku, Japan, published as No. 2011 of the Proceedings of the U.S. National Museum.

THE Proceedings of the South London Entomological and Natural History Society for the past year contain matter of much interest, and give proof of continued activity on the part of the members of this well-known association of naturalists. Mr. A. E. Tonge's presidential address, delivered at the beginning of the present year, includes some excellent observations on the external characters of British lepidopterous ova. Mr. R. Adkin's communication on the subject of varietal names is marked by strong common sense, and the same may be said of his paper on the labelling of entomological specimens—a matter that was often neglected by the naturalists of a former generation, to the detriment of many results of their labours. Mr. A. E. Gibbs's paper on the genus Cœnonympha gave occasion for some interesting exhibits of the local variation to which species of that genus are subject. A useful account, well illustrated by photographs and drawings, of the British species of Forficulodea is contributed by Mr. W. J. Lucas. Perhaps the most important of the papers printed *in extenso* is Mr. C. J. Gahan's excellent memoir on mimicry in the Coleoptera. The author is a well-known authority on this order, and the great extent of his special knowledge enables him to treat the subject in a comprehensive and convincing manner. It is noteworthy to find that he considers it "hopeless to try to explain the facts of mimicry in any other way than as the result of natural selection." The reports of the field excursions and the discussions held at the meetings contain some valuable records, and the volume as a whole furnishes good evidence of the excellent work that may be done by local societies, such as the present, in encouraging an intelligent interest in the objects of natural history.

Petermann's Mitteilungen for September contains a characteristic portrait of the late Prof. H. Credner, the well-known geologist of Leipzig. Dr. K. Andrée discusses the important question of the correlation of sedimentary rocks with conditions of deposition, as a guide in the formation of palæogeographic maps.

Mr. C. A. Cotton, of Wellington, N.Z., publishes a paper on the physiography of the Middle Clarence Valley, New Zealand (*Geographical Journal*, vol. xlii., p. 225), in which the influence of Prof. W. M. Davis is apparent in the lucid illustrations of local earth-structure and surface features. The author contests Park's view that an ice-sheet passed across the district, which lies in the north-east of the south island.

Messrs. W. Hanns, A. Rühl, H. Spethmann, and H. Waldbaur, who accompanied Prof. W. M. Davis on a European tour in 1912, have published "Eine geographische Studienreise durch das westliche Europa" (Leipzig: Teubner, price 2.40 marks), a brochure which should well illustrate modern methods of investigation. The regions selected include Snowdonia, Cornwall, central France, and the famous Kirchet of Meiringen.

The Journal of the Meteorological Society of Japan for May contains, *inter alia*, a useful article on the amount of evaporation of water, by Mr. Y. Horiguti, in which he gives some results of his investigation of the subject with a circular atmometer 8 in. in diameter, 4 in. in depth, and a small layer of water, the instrument being freely exposed to wind and sunshine. The determination of evaporation is a very uncertain operation, and in a recent essay (Strachan, "Basis of Evaporation") it is noted that the methods hitherto tried with tanks have been more or less failures, although, with the assistance of theory, better results ought eventually to be obtained. Many formulæ by well known men of science already exist, and Mr. Horiguti has added another to the number. The result of his investigations shows that his formula, together with others referred to, will fairly well represent evaporation in the shade, but that in the open air this is not the case. He concludes that "there remains an ample space for further studies."

In 1881 a MS. known as the Bakhshâli, from a village of that name in the Peshawar district, was discovered. If the view of Dr. Hoernle be accepted, that it belongs to the third or fourth century A.D., it would be of unique value as pushing back the mathematical knowledge of the Hindus to a date much earlier than has hitherto been admitted. The question of date has been reopened by Mr. G. R. Kaye in vol. viii., No. 9, of the Proceedings Asiatic Society of Bengal for 1912. After a careful review of its contents he arrives at the conclusion that it is later than the time of Brahmagupta, or even later than Bháskara. "The literary form and the mathematical form of the manuscript point to a comparatively late period; the script is not ancient; the notation used and the rules and examples have nothing ancient about them, and my general conclusion is that the manuscript was not written much before the twelfth century A.D. It may have been an adaptation of a more ancient work, but it is certainly not a faithful copy of any work composed much before the twelfth century." It will be interesting to await Dr. Hoernle's reply to this communication.

In the Proceedings of the Tokyo Mathematico-Physical Society (2), vii., 5, Mr. S. Yokota gives an analytical solution of the stress distribution in a riveted plate due to a simple push applied to a rivet, the surfaces being smooth. The lines of principal stress are plotted.

In addition to the usual lists of students and degree proceedings, the Johns Hopkins University Circular contains interesting mathematical notes edited by Prof. Frank Morley. Mr. J. E. Rowe, in a note on Fermat's classical theorem, shows that the sum of two powers of integers cannot be the same power of another integer (excluding, of course, the case of second powers) unless the index is greater than 100 and the largest integer greater than the twenty-ninth power of 10; and further, considering next the two types in which the greatest integer is odd or even respectively, the author says, "Also it is shown that one-half of all possible solutions of each of the two types just described are impossible" (!). In a note on self-dual rational quartics, Mr. L. E. Wear shows that the only quartic curves which reciprocate into themselves are the limacon and the obvious case of two conics.

Prof. E. B. Wilson, writing in the July Bulletin of the American Mathematical Society on the unification of vector notations, expresses a doubt whether the several steps which have been taken in this direction recently have been steps "backward or forward, sideways or up in the air." The committee appointed at Rome in 1908 has not yet presented a report, so that not much of a step in any direction can be attributed to it. There has been great activity in the use of vector methods in Italy, which has served to stereotype the notations of Burali-Forti and Marcolongo, which differ from those in vogue in Germany and America. A valuable report by the late Dr. Macfarlane has been published in the Bulletin of the International Association for Promoting the Study of Quaternions and Allied Systems of Mathematics for June, 1912, and Prof. Wilson hopes "that the place of publication may not prove a burial ground for the essay." Lastly, Langevin's article in the French Mathematical Encyclopædia proposes a system of notations in which vectors are distinguished by interlineal superscripts, no special founts being used, and this seems likely to be widely adopted in France.

IN the *Journal de Physique* for August, M. A. Henry, physics master at the Reims Lycée, describes how he has applied a well known form of micromanometer to make measurements in a number of directions in which a manometer is not often utilised. The manometer consists of a U tube with wide limbs joined by a horizontal capillary tube. The limbs are about half-filled with carbon tetrachloride, and the capillary contains a small bubble of air Any slight difference of pressure at the ends of the capillary produces a considerable motion of the bubble. The instrument is calibrated by tilting the tube support by means of a screw at one end. M. Henry shows how the instrument may be used to measure the excess of pressure in a soap-bubble and the effect of charging the bubble electrically, a small volume, a mass of a few grams, the density of a gas or of a solid, small amounts of heat, specific inductive capacity, difference of potential, a flow of gas, and the pressure exerted by a sound-wave.

THE determination of sulphur in illuminating gas is the subject of Technologic Paper No. 20 of the Bureau of Standards, by R. S. McBride and E. R. Weaver, issued by the Department of Commerce, Washington. Experiments were made with the gas referees' apparatus and the apparatus designed by Elliot, Hinman-Jenkins, Drehschmidt and Somerville. The results of a series of comparisons are given, in which many variations were made to determine the best conditions of operation and the sources of error. The referees' apparatus appears to be most used in America as well as here, and possesses the advantages of simplicity and convenience; the accuracy obtainable with this, as with other forms, has been often over-estimated. The concluding portion of the pamphlet deals with the estimation of the sulphate in the liquid condensate, and details are given of the gravimetric determination, a rapid turbidimetric method, and a volumetric method based on that due to Holliger. Although most gas companies in this country are now free from any restriction as to the amount of sulphur present in their gas other than sulphuretted hydrogen, the pamphlet will be very useful to any chemists having to deal with this problem.

IN the *Bulletin de la Société d'Encouragment* (No. 6, p. 805) Prof. Camille Matignon discusses in an interesting paper some of the less known recent processes for the industrial fixation of atmospheric nitrogen. The well known methods utilising an electric flame are only briefly touched upon, but especial reference is made to Schloesing's process of absorbing the nitrous gas so obtained with lime at a temperature of 300°. The principal processes dealt with are those of Haber, in which nitrogen and hydrogen are made to combine directly under the influence of a catalytic agent, and that of Serpek based on the formation of aluminium nitride by heating a mixture of alumina and carbon in a current of pure nitrogen at a temperature of 1800°. The latter method has a particularly bright industrial outlook owing to the fact that by decomposing the nitride with dilute alkali not only is ammonia obtained, but it is possible by means of it to transform bauxite into alumina suitable for the aluminium industry at a much reduced cost. The action between the alumina and carbon is effected in revolving cylinders, which are lined with aluminium nitride itself, as being the only sufficiently refractory material which will withstand the high temperatures employed.

RED Book No. 182 of the British Fire Prevention Committee contains an account of tests on three window openings filled in with Luxfer electro-glazing. The record gives the effect of a fire of ninety minutes' duration, the temperature reaching 1500° F. and not exceeding 1650° F., followed by the application of water for two minutes on the fire side. This test again indicates that forms of special glazing are being produced commercially that can serve most efficiently to stop the spread of a fire of considerable severity. It is the second occasion upon which "lights" presented for test by the British Luxfer Prism Syndicate, Ltd., have met the strain of a ninety minutes' test at temperatures exceeding 1500° F. Red Book No. 183 contains records of tests on two steel-cased reinforced concrete doors by Messrs. Chubb and Sons, one hung on runners and made to slide, the other hung on hinges, fixed in a reveal. The latter door secured "full protection" (Class B). The partially successful efforts to produce a single door able to do the work of two iron doors required under the London Building Act are of considerable technical importance. The radiation through the doors was very small. Doubtless the problem of making a sliding door flame-proof around the edges will be overcome.

OUR ASTRONOMICAL COLUMN.

A NEW COMET.—A Reuter message from Perth, W.A., dated October 7, reports that a faint new comet has been observed in the position R.A. 2h. 31m.; Dec. 3° 48′ N.

THE RETURN OF WESTPHAL'S COMET.—The identification of Mr. Delaran's comet with Westphal's comet of 1852 is now complete, its positions being in accord with those predicted on the assumption of the object being the return of the comet of Westphal.

The following ephemeris for the current week is given by Prof. H. Kobold in a Supplement to the *Astronomische Nachrichten*, No. 4684:—

12h. M.T. Berlin.

	R.A. h. m. s.	Dec. ° ′	Mag.
Oct. 9	21 16 24	+ 8 18·2	8·4
10	13 52	9 7·9	
11	11 25	9 57·1	
12	9 2	10 45·6	8·4
13	6 44	11 33·8	
14	4 32	12 21·3	
15	2 25	13 8·3	
16	21 0 24	+13 54·8	8·4

After observations on September 28, the corrections to the above ephemeris are as follows:—R.A. −34s., Dec. +9·9′.

As this comet does not reach perihelion until November 26, and as it is slowly approaching the earth, its brightness will be increased. In appearance the nucleus is described as well defined but elongated, and surrounded by a nebulosity 20′ in diameter. The tail has been observed to be 1·2° in length, while a